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DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. 371

989.1026

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

09/763745

INTERNATIONAL APPLICATION NO.  
PCT/FI99/00701INTERNATIONAL FILING DATE  
26 AUGUST 1999PRIORITY DATE CLAIMED  
26 AUGUST 1998

## TITLE OF INVENTION

**METHOD IN SEQUENTIAL WINDING STATIONS AND PRODUCTION LINE COMPRISING SEQUENTIAL WINDING STATIONS**

## APPLICANT(S) FOR DO/EO/US

**Teppo KOJO and Esa AALTO**

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
  - a. ☒ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ has been transmitted by the International Bureau.
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210).
8. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☐ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☒ Certificate of Mailing by Express Mail
20. ☒ Other items or information:

**NOTIFICATION OF THE RECORDING OF A CHANGE  
RETURN POST CARD**

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.53) <b>09/763743</b>	INTERNATIONAL APPLICATION NO. <b>PCT/FI99/00701</b>	ATTORNEY'S DOCKET NUMBER <b>989.1026</b>
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21. The following fees are submitted:				<b>CALCULATIONS PTO USE ONLY</b>	
<b>BASIC NATIONAL FEE ( 37 CFR 1.492 (a) (1) - (5) ) :</b>					
<input checked="" type="checkbox"/>	Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO .....	\$970.00			
<input type="checkbox"/>	International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO .....	\$840.00			
<input type="checkbox"/>	International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO .....	\$690.00			
<input type="checkbox"/>	International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) .....	\$670.00			
<input type="checkbox"/>	International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) .....	\$96.00			
<b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>				<b>\$1,000.00</b>	
Surcharge of <b>\$130.00</b> for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).				<b>\$0.00</b>	
<b>CLAIMS</b>	<b>NUMBER FILED</b>	<b>NUMBER EXTRA</b>	<b>RATE</b>		
Total claims	12 - 20 =	0	x \$18.00	<b>\$0.00</b>	
Independent claims	4 - 3 =	1	x \$80.00	<b>\$80.00</b>	
Multiple Dependent Claims (check if applicable). <input type="checkbox"/>				<b>\$0.00</b>	
<b>TOTAL OF ABOVE CALCULATIONS =</b>				<b>\$1,080.00</b>	
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28) (check if applicable). <input type="checkbox"/>				<b>\$0.00</b>	
<b>SUBTOTAL =</b>				<b>\$1,080.00</b>	
Processing fee of <b>\$130.00</b> for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492 (f)).				<b>\$0.00</b>	
<b>TOTAL NATIONAL FEE =</b>				<b>\$1,080.00</b>	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). <input checked="" type="checkbox"/>				<b>\$40.00</b>	
<b>TOTAL FEES ENCLOSED =</b>				<b>\$1,120.00</b>	
				<b>Amount to be: refunded</b>	<b>\$</b>
				<b>charged</b>	<b>\$</b>

- ☒ A check in the amount of **\$1,120.00** to cover the above fees is enclosed.
- ☐ Please charge my Deposit Account No. \_\_\_\_\_ in the amount of \_\_\_\_\_ to cover the above fees.  
A duplicate copy of this sheet is enclosed.
- ☒ The Commissioner is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. **50-0518** A duplicate copy of this sheet is enclosed.

**NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.**

SEND ALL CORRESPONDENCE TO:

**STEINBERG & RASKIN, P.C.**  
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SIGNATURE

**Martin G. Raskin**

NAME

**25,642**

REGISTRATION NUMBER

**February 26, 2001**

DATE

By: *Francesca Sordani*  
*F. Sordani*  
Reg. No. **P-47,918**

989.1026

**UNITED STATES PATENT AND TRADEMARK OFFICE**

Re: Application of: Teppo KOJO et al.  
Serial No.: Not yet known  
Filed: Simultaneously  
For: **METHOD IN SEQUENTIAL WINDING  
STATIONS AND PRODUCTION LINE  
COMPRISING SEQUENTIAL  
WINDING STATIONS**

**PRELIMINARY AMENDMENT**

Assistant Commissioner of Patents  
Washington, D.C. 20231

February 26, 2001

Sir:

Prior to examination and calculation of the filing fee, please amend the above-identified application as follows:

**IN THE SPECIFICATION:**

Please amend the specification as follows (reference is made to the lines as numbered).

Page 1, line 3, insert --**FIELD OF THE INVENTION**--;

line 8, insert --**BACKGROUND OF THE INVENTION**--.

Page 3, line 4, insert --OBJECTS AND SUMMARY OF THE INVENTION--.

Page 4, line 8, insert --BRIEF DESCRIPTION OF THE DRAWINGS--.

Page 4, line 18, insert --DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS--.

line 35, change "the drawing" to --Fig. 1--.

Page 10, line 4, insert the following:

-- The present invention has been described herein with reference to preferred embodiments of the invention however the description provided herein is for illustrative purposes and should not be considered to be exhaustive. It is understood that modifications and variations of the above describe preferred embodiments are possible without departing from the spirit or scope of the present invention.--

**IN THE CLAIMS:**

Please amend the claims as follows:

Claim 4, delete "or 3".

Claim 5, change "any of the foregoing claims" to --claim 1--.

Claim 6, change "any of the foregoing claims" to --claim 1--.

**REMARKS**

The specification has been amended to include section headings at appropriate locations.

The claims have been amended to remove multiple dependencies therefrom in order to reduce the filing fee.

The amendments to the claims herein have been made to conform the claims to U.S. practice and have not been made for purposes of patentability.

An early and favorable action on the merits is earnestly solicited.

Respectfully submitted,

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Method in sequential winding stations and production line comprising sequential winding stations

5 The invention relates to a method in sequential winding stations, which method is presented in the preambles of the appended claims 1 and 7. The invention also relates to a production line comprising sequential winding stations.

10 The production of paper from pulp to finished paper may be composed of several sequential winding and unwinding stages in which the continuous paper web passed from the preceding processing stage is reeled around a reel spool to form a machine reel, and this machine reel is unwound again at the unwinding stage to pass the paper web to the next processing stage. A typical example is a so-called off-line  
15 production of coated paper grades, in which in the paper production line i.e. in the paper machine a continuous web of several metres in length is produced from fibrous pulp, which web is reeled in the reel-up in the terminal end of the paper machine to form a machine reel. Several reel-ups have been presented in the patent literature, and reference can be made for example to the European patents 483092, 483093 and to the  
20 international patent publication WO 95/34495. In such winding stations a continuous web passed from the preceding sections of the machine is reeled around a reeling axle i.e. a reel spool, which is a roll of several meters in width, dimensioned with respect to the size of the reel in a suitable way and supported in the winding station by its ends with a  
25 suitable supporting structure. The winding stations operate continuously, wherein a new reel spool is brought to the reeling station without reducing the speed of the preceding machine, and the paper web is guided around a new reel spool by using change methods for  
30 which numerous patented solutions have been developed. Similarly, patented solutions have been developed for the ways of arranging a loading (linear load) between the reeling cylinder guiding the web and the reel.

35 In the unwind, the machine reel reeled in the preceding stage is unwound, and a winding station of this type is presented for example in the Finnish patent 100323 and in the corresponding US patent

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5709355. The unwind of a coater presented herein operates continuously, wherein a new machine reel which is brought to the unwind is joined at full speed to the paper web of a machine reel that is becoming empty, by means of a splicing device. The unwind is used in the beginning of off-machine coaters to lead the web wound up in the preceding winding station from the successive reels to the coating process. The preceding winding station can be a so-called rereeler in which the reel reeled in the reel-up of a paper machine is unwound and wound up to form a reel which is suitable for the finishing process.

10

In the end of the off-machine coater there is again a reel-up in which the paper web passed from the coater is reeled around the reel spool again to form a machine reel.

15

In order to implement the continuous operation, the change of the reels in the reel-up and in the unwind should proceed without problems, and these functions are the most critical stages in the continuous winding up or unwinding. Because of this, it would be advantageous to produce machine reels as large as possible to reduce the number of changes.

20

This is restricted by the heavy weight (several tens of tonnes, in wide machines typically over 50 tonnes) of the reel, and the existing constructions which are dimensioned for particular maximum diameters of the machine reel.

25

Heretofore, attention has been paid to single winding processes (winding up, unwinding) and their problems.

30

Conventionally, in lines producing coated paper grades, for example in an LWC-paper line provided with a separate coater, machine reels of equal size are reeled in the reel-up of the paper machine and thereafter in each reel-up process in accordance with the requirements set for the customer rolls of the slitter-winder.

35

Especially in lines producing coated paper grades, as for example in the above-mentioned LWC line, it is difficult to modernize the winding stations in such a way that the diameter of the reel is increased throughout the entire line, because in that case all the reel-ups

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unwinds, cranes, reel spools (nearly 100 by number) and storage rail arrangements have to be modernized. Similarly, inside a factory the lifting height might restrict the growth of the diameter at some points. Thus, when compared to the attained advantages, it is not lucrative to  
5 increase the diameters of the reels, even if new winding station constructions provided the possibility for this.

The purpose of the invention is to eliminate the aforementioned drawbacks and to present a new reeling concept in a production line  
10 comprising sequential winding stations. To attain this purpose, the method is primarily characterized in what will be presented in the characterizing part of the appended claim 1.

The invention utilizes the short circulations of the reel spools between  
15 the reeling-up and unwinding stages. Thus, the reel spools in the production line are dimensioned to be different in size, and it is possible to use a different size in each circulation. Similarly, it is possible to dimension the winding stations for reel spools of different sizes, and for maximum diameters of the reel. Heretofore, it has been natural to use  
20 reel spools of equal size in the entire production line, wherein they can be utilized anywhere.

The invention is also characterized by the facts stated in the characterizing part of the appended claim 7. By reeling larger quantities  
25 of paper in the first reel-up than in the second reel-up, which is located at some point after the first reel-up in the production line, it is possible to reduce the number of changes in the beginning of the line.

The invention enables a suitable modernizing solution for the winding  
30 stations in the production line, by means of which a greater advantage is achieved with smaller investments. Thus, it is only necessary to modernize the winding stations in the beginning of the line, such as the reel-up of the paper machine and the rereeler and the unwind of the coater for paper for the part of the maximum diameter, and possibly the  
35 winding stations therebetween. In addition, new, bigger reel spools (20 to 30 by number) are required in this interval as well as a possible additional capacity of one crane. Between the paper machine and the



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coater for paper the circulation of the reel spools functions completely independently, i.e. the new rolls remain only within this interval.

5 Similarly in lines where coated grades are produced with on-line coating in a paper machine, it is possible to modernize the reel-up of the paper machine and arrange new reel spools at least in the area between the reel-up and the rereeler.

10 In the following, the invention will be described in more detail with reference to the appended drawings, in which

Fig. 1 shows a method and a production line according to the invention,

15 Fig. 2 shows a second possible production line, and

Fig. 3 illustrates the circulation of the reel spools in a side view.

20 Fig. 1 illustrates a paper production line according to the invention in a schematical top view. The line comprises the following sequential parts of the production and finishing process for paper:

- a paper machine PK, which produces from fibrous pulp a continuous paper web which fulfills particular quality requirements,
- 25 — a reel-up KR1 of a paper web which is arranged to reel the continuous web passed from the paper machine around the reel spools to form successive machine reels,
- a rereeler VR which is equipped with an unwind and a reel-up, and which is arranged to unwind the machine reels
- 30 formed by the reel-up KR1 and to form machine reels suitable for the finishing process from the unwound web, wherein it is possible to remove paper of bad quality at the same time and to join the so-called web break reels coming
- 35 from the paper machine together to full-sized machine reels,

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- an unwind AR of the finishing machine for paper, which is arranged to unwind the machine reels and to splice the webs of successive machine reels together,
- 5 — a finishing machine JK for paper, which receives a continuous web from the unwind AR and conducts a finishing treatment, such as coating, for the paper, which is important in view of the quality of the end product,
- 10 — a reel-up KR2 for the finishing machine JK for paper, which is arranged to reel the continuous web passed from the finishing apparatus around the reel spools to form successive machine reels in a similar way as the reel-up KR1 of the paper machine,
- 15 — an unwinding device AL, such as a slitter-winder, which unwinds the machine reels formed with the preceding reel-up KR2 and forms customer rolls thereof which have suitable dimensions for the end use of the product.

20 In the paper machine, the rereeler and the finishing machine a full-width web is processed, the width of the web corresponding substantially to the production width of the paper machine. This web is divided into narrower webs in the slitter-winder after the unwinding to form customer rolls of particular width.

25 In Fig. 1, the finishing machine JK is a coater for paper, a so-called off-machine coater, which is marked with the letter combination PPK.

30 In the paper machine, machine reels are reeled from the paper web passed from the production process, the weight of the reels being typically over 10 tonnes, depending on the amount of full-width paper web to be reeled.

35 A separate circulation of the reel spools is arranged between the reel-up KR1 of the paper machine and the unwind AR of the finishing machine for paper, and it is illustrated with arrows TK1. From the unwind AR of the paper finishing machine JK, the reel spools are returned to the reel-up KR1 of the paper machine PK, wherefrom they travel inside the machine reels back to the unwinder AR. Because this

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first part of the paper production line has a separate circulation of the reel spools, the reel spools can be different, and they advantageously have a larger diameter than the reel spools employed in the terminal end. In the terminal end, i.e. between the reel-up KR2 of the finishing machine JK for paper and the unwinding device AL following thereafter, there is a separate circulation TK2 of the reel spools.

Similarly, the winding stations KR1, VR and AR preceding the finishing machine JK for paper can be dimensioned for larger machine reels, which contain advantageously at least a double amount of paper when compared to the machine reels formed in the reel-up KR2 after the finishing machine JK for paper. This reduces the number of changes conducted in the terminal end of the paper machine PK and in the beginning of the finishing machine JK for paper. Thus it is also possible to attain more running time between the changes, and thereby more capacity in the rereeler VR.

In lines whose principle complies with Fig. 1, it is only necessary to modernize the winding stations KR1, VR and AR and possible other constructions in the beginning. After the modernization, a double length or another suitable larger than previously length of paper is run between the paper machine PK and the finishing machine JK for paper, such as a coater for paper, to form a machine reel, wherein the splicing operations of the finishing machine JK and thereby also the risk for break (splicing + leading through the splices) is halved and reduced in a corresponding proportion. For example in a coater for paper with four stations, one break typically lasts about an hour and includes cleaning, washing and tail threading. The efficiency of the coater for paper can be considerably improved with this arrangement also in other respects, because the greatest production is attained and the production control is easiest with an even operational run. It is possible to produce big machine reels in the reel-up KR1 in the terminal end of the paper machine PK with the help of the new reeling technique and the new reel spools. At the same time, the total output of the line is increased by means of the improved reeling efficiency (bottom and surface broke is reduced in the reel up and the rereeler of the paper machine, change breaks are reduced). Modernization is restricted to a smaller area in the

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factory, and the remaining sections after the finishing machine JK for paper, such as a coater for paper function in a similar way as before. Thus, the same number of changes as before is conducted in the reel-up KR2 of the finishing machine JK, because the sizes of the machine reels in the terminal end of the entire line remain unchanged after the modernization.

In Fig. 1, the finishing machine for paper is a coater for paper. Fig. 2 shows another possible line in which on-machine coated paper is produced with a paper machine PK. Thus, the circulation TK1 of reel spools of different dimensions is effective between the reel-up KR1 and the rereeler VR. After the rereeler, the finishing machine JK is an off-line calender, such as a supercalender (marked with the letter combination SC), which is provided with an unwind for unwinding the web from the machine reel and guiding it through the calender and a reel-up for gathering the calendered web on the reel. After the off-line calender there is an unwinding device AL, such as a slitter-winder, in which the machine reel reeled up in the off-line calender is unwound and customer rolls of suitable length are formed thereof. The unwinding of the off-line calender is not continuous, and, as can be seen in Fig. 2, there may be two or more calenders and slitter-winders next to each other. The reel-up KR1 utilizes reel spools with a larger diameter, and it is used for forming larger machine reels than those formed in the rereeler VR, whereafter the circulations TK2 of smaller diameter reel spools are effective between the rereeler and the off-line calender and between the off-line calender and the unwinding device AL. With the rereeler VR smaller reels are reeled, for example two small machine reels from one large machine reel. In the modernization, it is sufficient that the reel-up KR1 of the paper machine PK is modernized for the part of the maximum diameter, and new, larger reel spools are disposed between the reel-up KR and the rereeler VR.

Furthermore, Fig. 3 illustrates in a simplified manner the two different circulations TK1 and TK2 of the reel spools, the diameters of different sizes of the reel spools T1 and T2 transferred therein, as well as the machine reels R of different sizes travelling in the circulation. Between the rotations there may be any finishing machine JK for paper. The

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advantages of the invention become clearly apparent if the finishing machine for paper is such a machine to which paper web is continuously passed from its unwind AR, with "flying" changes from the successive machine reels by splicing the webs of different reels together, in a similar way as when passing the paper web to the coater PPK for paper. However, the invention can also be used in situations where the paper web is passed from the machine reels R to the finishing machine JK in such a way that the webs of different reels are passed separately from each other, wherein there is a pause between the successive runs of the web. Especially in the latter case in which the webs of the machine reels R are not spliced to each other, the circulation TK1 of the larger reel spools T1 can be effected only between the reel-up KR1 of the paper machine and the rereeler VR preceding the finishing machine JK, in a manner described in Fig. 2, and larger machine reels R are reeled up and unwound within this interval.

The new reel spools can have a diameter which is at least 25 %, advantageously at least 35 % larger than the diameter of the old reel spools. As an example of a suitable dimensioning of the new and old reel spools and machine reels, it is possible to present the following values, which do not restrict the invention:

**Old (T2)**

diameter of the reel spool	700 mm
diameter of the machine reel	2400 mm
length of the paper on the reel	about 70 km

**New (T1)**

diameter of the reel spool	1300 mm
diameter of the machine reel	3500 mm
length of the paper on the reel	about 140 km

The invention is not restricted solely to the alternatives presented above, but it can be modified within the scope of the inventive idea presented in the claims. In Fig. 1, the circulation TK1 of the reel spools of different dimensions can be arranged between the paper machine

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reel-up KR1 and the rereeler VR, and a separate circulation may be provided between the rereeler VR and the unwind AR, the reel spools of which have the same dimensions as those in circulation TK1. Thus, the same advantage is attained in the unwinding. The circulations can be arranged freely according to the situation, because the same reel spools can be used anywhere in the area between the reel-up KR1 and the unwind AR. Furthermore, in Fig. 1 broken lines illustrate an off-line calender, such as a supercalender SC, located after the reel-up KR2 of a coater PPK for paper, wherein a separate circulation TK2 of the reel spools may be provided after the reel-up KR2 and the off-line calender. Also in this line, there may be several calenders and unwinding devices AL following thereafter, located in parallel relationship in the way shown in Fig. 2. In the line, there may also be other treatment devices known in the field, and it is possible to use suitable placement solutions of the devices therein, while the basic principle of the invention remains the same.

It is also apparent that, irrespective of the size of the reel spools, larger reels are reeled in the winding station located at an earlier position in the line (the first reel-up) than with a winding station located later in the line (the second reel-up). Thus, the advantage is attained that in the beginning, before the second reel-up, there are fewer reel changes in some reeling up process and at least in the unwinding process following this reeling up process. The reel spools in the line can also be equal in size, provided that they are suitable for the larger reel size. Larger reels, preferably at least with a double amount of paper, can be used for transferring the paper between the reel-up KR1 of the paper machine and the unwind AR of the finishing machine. It is also possible that larger reels, preferably with a double amount of paper, are reeled not earlier than in the reel-up of the rereeler VR and unwound in the following unwind AR of the finishing machine JK, for example in the unwind of the coater for paper PPK or in the unwind of the supercalender SC, the reels to be reeled in the second reel-up in the terminal end thereof being again smaller (the reel-up in the coater PPK for paper or in the supercalender SC). Thus, it is possible to arrange the circulation of larger reel spools only between the reel-up of the

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rereeler VR and the unwind AR of the finishing machine JK, if it is necessary to use larger reel spools for larger reels.

Patented in Finland

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Claims:

1. Method in sequential winding stations which are located in a production line processing the web at successive stages, wherein in the method the paper web issuing from a paper machine (PK) is reeled in a reel-up (KR1) around a reel spool (T1) to form a reel, the paper web is unwound in an unwind (AR) from the reel to a finishing machine (JK) for paper, and the paper web passed through the finishing machine (JK) for paper is reeled in a reel-up (KR2) around a reel spool (T2) to form a reel, **characterized** in that at least the reel spools (T1) used in the area between the reel-up (KR1) of the paper machine (PK) and an unwind thereafter have different dimensions, advantageously larger diameters, than the reel spools (T2) used later in the production line.
2. Method according to claim 1, **characterized** in that the reel spools (T1) used in the area between the reel-up (KR1) of the paper machine (PK) and the unwind (AR) of the finishing machine (JK) for paper have different dimensions, advantageously larger diameters, than the reel spools (T2) used in the reel-up (KR2) of the finishing machine (JK) for paper.
3. Method according to claim 2, **characterized** in that the unwind (AR) of the finishing machine (JK) is a continuous unwind, in which the web is continuously led from successive reels to the finishing machine (JK).
4. Method according to claim 2 or 3, **characterized** in that the reel spools (T2) whose dimensions differ from those of the reel spools (T1) used in the area between the reel-up (KR1) of the paper machine (PK) and the unwind (AR) of the finishing machine (JK) for paper, are used in the production line in the reel-up (KR2) of the finishing machine (JK) for paper and from there onwards.
5. Method according to any of the foregoing claims, **characterized** in that in the reel-up (KR1) of the paper machine (PK), larger amounts, preferably at least double amounts of paper web are reeled on the reels than in the reel-up (KR2) of the finishing machine (JK) for paper.



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6. Method according to any of the foregoing claims, **characterized** in that the finishing machine (JK) for paper is a coater for paper or an off-line calender such as a supercalender.

- 5 7. Method in sequential winding stations which are located in a production line processing a paper web at successive stages, wherein in the method, the paper web issuing from a preceding production stage is reeled in a first reel-up around a reel spool to form a reel, the paper web is unwound from the reel in an unwind, and the paper web is  
10 reeled in a second reel-up around a reel spool to form a reel, **characterized** in that in the first reel-up larger amounts, preferably at least double amounts of paper are reeled on the reel than in the second reel-up.
- 15 8. Method according to claim 7 in sequential winding stations, wherein in the method the paper web issuing from the paper machine (PK) is reeled in the reel-up (KR1) around the reel spool (T1) to form a reel, the paper web is unwound in the unwind (AR) from the reel to the finishing machine (JK) for paper, and the paper web passed through the  
20 finishing machine (JK) for paper is reeled in the reel-up (KR2) around the reel spool (T2) to form a reel, **characterized** in that in the reel-up (KR1) of the paper machine (PK) larger amounts, preferably at least double amounts, of paper web are reeled on the reels than in the reel-up (KR2) of the finishing machine (JK) for paper.
- 25 9. Production line comprising sequential winding stations, in which a paper machine (PK), a reel-up (KR1) for the paper machine, an unwind (AR) of a finishing machine (JK) for paper, the finishing machine (JK) for paper, and a reel-up (KR2) of the finishing machine (JK) for paper are located one after the other, **characterized** in that at least the wind-up (KR1) of the paper machine is dimensioned for larger diameters of the reel to be reeled from the paper web than the reel-up (KR2) of the finishing machine (JK) for paper.
- 30 10. Production line according to claim 9, **characterized** in that also the unwind (AR) of the finishing machine (JK) for paper is dimensioned for
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larger reels to be reeled from the paper web than the reel-up (KR2) of the finishing machine (JK) for paper.

- 5 11. Method for modernizing a production line comprising sequential winding stations, wherein in the production line a paper machine (PK), a reel-up (KR1) for the paper machine, an unwind (AR) of a finishing machine (JK) for paper, the finishing machine (JK) for paper, and a reel-up (KR2) of the finishing machine (JK) for paper are located one after the other, **characterized** in that in the modernization at least the
- 10 reel-up (KR1) of the paper machine is dimensioned for larger diameters of the reel to be reeled from the paper web than the reel-up (KR2) of the finishing machine (JK) for paper.
- 15 12. Method according to claim 11, **characterized** in that also the unwind (AR) of the finishing machine (JK) for paper is dimensioned for larger reels to be reeled from the paper web than the reel-up (KR2) of the finishing machine (JK) for paper.

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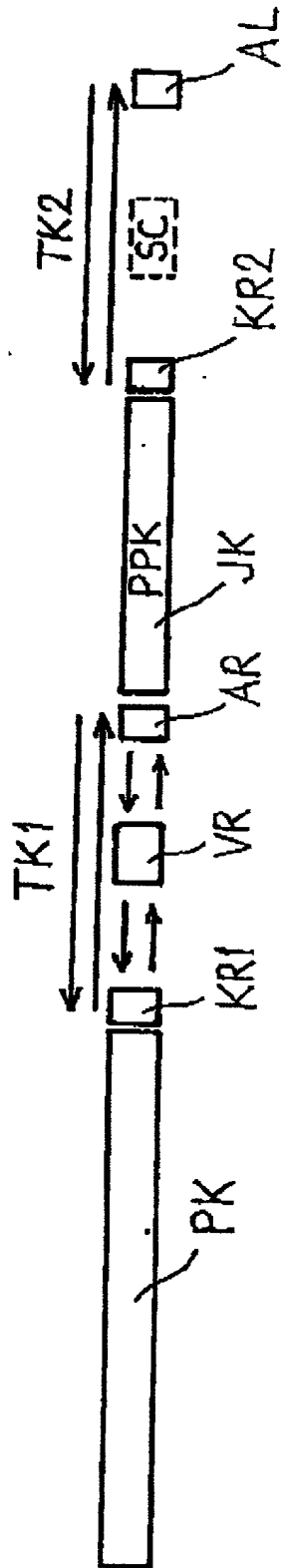


Fig. 1

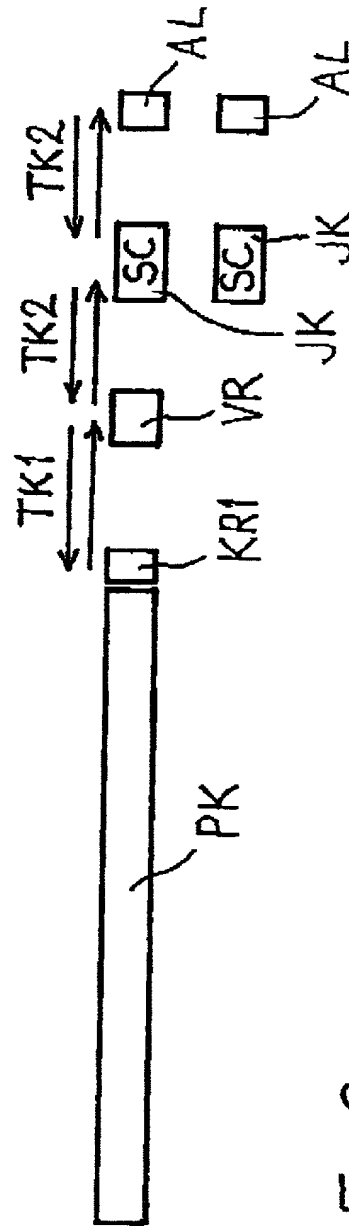


Fig. 2

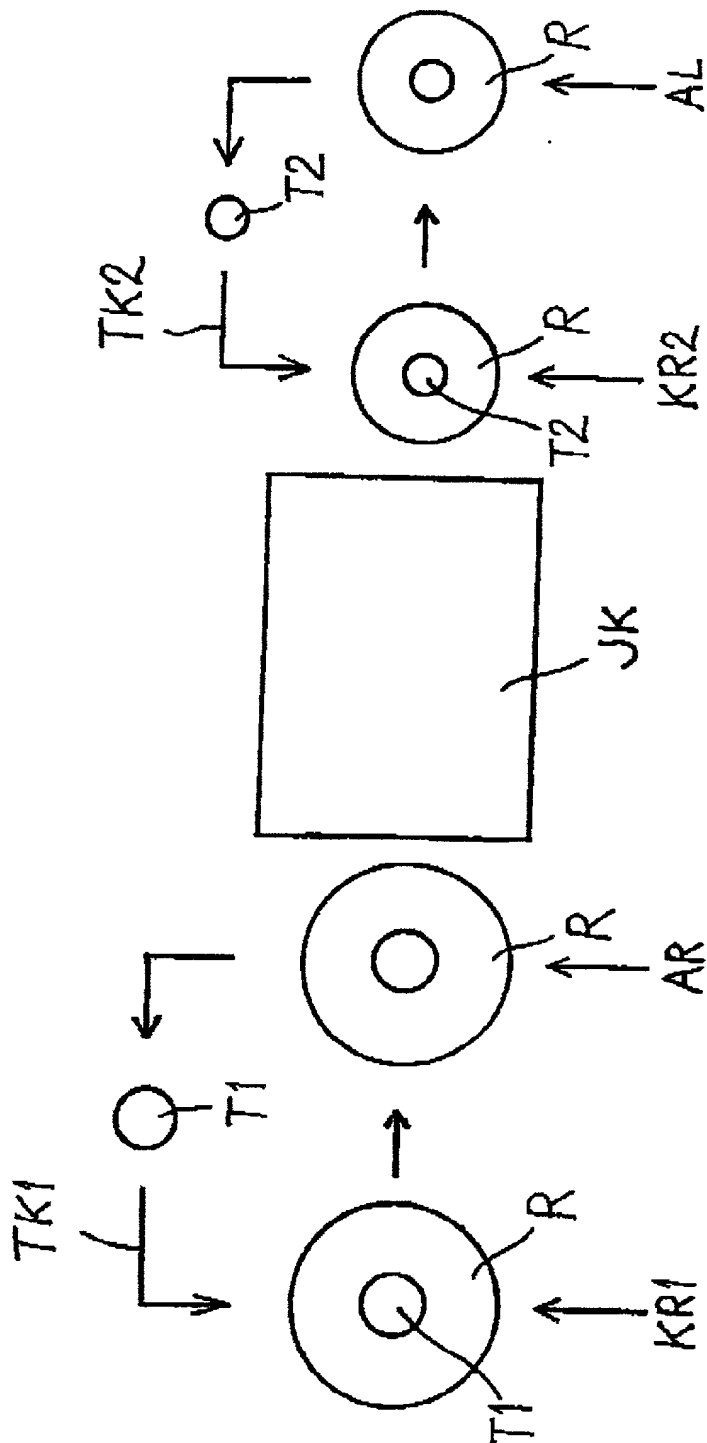


Fig. 3

# DECLARATION AND POWER OF ATTORNEY FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

- ☒ Declaration submitted with initial filing
- ☐ Declaration submitted after initial filing (surcharge (37 CFR 1.6(e) required))

First Named Inventor: Teppo KOJO

COMPLETE IF KNOWN:

Application Number: \_\_\_\_\_

Filing Date: \_\_\_\_\_

Group Art Unit: \_\_\_\_\_

Examiner Name: \_\_\_\_\_

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name. I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

## METHOD IN SEQUENTIAL WINDING STATIONS AND PRODUCTION LINE COMPRISING SEQUENTIAL WINDING STATIONS

(Title of the Invention)

the specification of which

☒ is attached hereto

OR

☐ was filed on (MM/DD/YY) \_\_\_\_\_ as United States Application Number or PCT International Application Number \_\_\_\_\_ and was amended on (MM/DD/YY) \_\_\_\_\_ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above. I acknowledge the duty to disclose information which is material to patentability of this application as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT International application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YY)	Priority Not Claimed	Certified Copy Attached?	
				Yes	No
981825	Finland	26 August 1998			X

I hereby claim the benefit under 35 U.S.C 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YY)

I hereby claim the benefit under 35 U.S.C 120 of any United States application(s), or 365(c) of any PCT International application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application

U.S. Parent Application or PCT Parent Number	Parent Filing date (MM/DD/YY)	Parent Patent Number (if applicable)
PCT/FI99/00701	26 August 1999	

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

☒ Customer Number 21831

Direct all correspondence to:

☒ Customer Number 21831

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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